

REMARKS/ARGUMENTS

The amendment to Claim 5, and new Claims 23 and 24, are supported by Claims 5 and 10 and by the specification as originally filed, including page 7, lines 3-10 and 20-24 and the several Examples. No new matter has been entered.

The prior rejection over Hewson, Sweet and Ichitani, each considered separately, has been modified by adding the disclosure in Shimosato to each cited reference. These new rejections are traversed.

As noted in Applicants' last response, none of Hewson, Sweet and Ichitani disclose a method of quenching under a reduced pressure condition, as presently claimed. Apparently recognizing this deficiency, the Office now cites Shimosato.

However, and importantly, Shimosato actually teaches away from the present invention in that the described purpose of the reference is to slow, or prolong, the vapor film or blanket stage:

[0021] When implementing the method of the present invention, first of all, the heating chamber 1 and the oil quenching chamber 8 are vacuumed to a prescribed degree of vacuum within a range of about 7 to 75 KPa. After both the chambers reach the prescribed degree of vacuum, the primary quenching is performed by transporting the workpiece W from the heating chamber 1 into the oil quenching chamber 8 and rapidly cooling the workpiece until the surface of the workpiece W comes to have a temperature just above the martensite transformation start point (Ms point) while immersing the workpiece in a high-temperature quenching oil 13. At this time, the quenching oil 13 is a high-temperature quenching oil, and the workpiece is cooled while being immersed into the quenching oil 13 in a state in which the internal pressure of the oil quenching chamber 8 is reduced. Therefore, the cooling speed in the vapor film stage is slower than that of the quenching with the high-temperature quenching oil under the atmospheric pressure, and the cooling time in the vapor film stage becomes long. As a result, the workpiece W is cooled slowly and uniformly in the high-temperature region (850 to 550 C).

Such a technique would *not* be viewed as viable by one of ordinary skill in the art using a quenching oil as presently claimed and comprising a vapor blanket breaking agent, as the express purpose of this agent is to *shorten* the vapor blanket stage, not prolong it. See, e.g., specification page 1, lines 26ff. The inventors of the present application have found that by using a quenching oil composed of a base oil having a kinematic viscosity of a certain value or more blended with a vapor blanket breaking agent, and by adjusting the pressure on the surface of the oil under a reduced pressure during quenching, the cooling performance of the oil can be adjusted over a wide range (specification page 3, lines 1-5). By blending the vapor blanket breaking agent with the base oil the vapor blanket stage is shortened under reduced pressure in the present invention, thereby resulting in a wider adjustable range of cooling characteristics (specification page 5, lines 24-28).

Accordingly, it is clear that one of ordinary skill in the art would not look to the pressure adjustments of Shimosato when setting quenching conditions using oils as presently claimed comprising a vapor blanket breaking agent, as the inherent nature of such oils would run contrary to the express purpose of the Shimosato disclosure which is to *lengthen* the vapor film or blanket stage. Thus, and regardless of the base oils and optional additives disclosed in Hewson, Sweet and Ichitani, which are not disclosed for use at reduced pressures, one of ordinary skill would not look to Shimosato for guidance in using a base oil comprising a vapor blanket breaking agent, as claimed, and thus the rejection should be withdrawn.

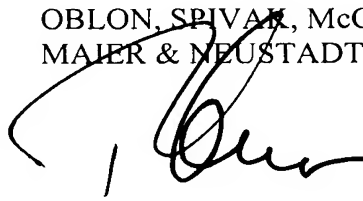
Application No. 10/591,705

Reply to Office Action of September 9, 2009

Accordingly, and in view of the above, Applicants respectfully request the reconsideration and withdrawal of the outstanding rejection, and the passage of this case to Issue.

Respectfully submitted,

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